UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,065	09/15/2003	Jian Dong	038190/294894	1939

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EXAMINER
ORTIZ RODRIGUEZ, CARLOS R

ART UNIT	PAPER NUMBER
2123	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/662,065	DONG, JIAN
	Examiner	**Art Unit**	
	CARLOS ORTIZ RODRIGUEZ	2123	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS,
WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *30 October 2008*.
2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-5* is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) *1-5* is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a) ☐ All b) ☐ Some * c) ☐ None of:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. _____.
    3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
       application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1.   Claims 1-5 are pending.

2.   The amendment to the Abstract filed 10/30/08 has been entered.

Response to Arguments

3.   Applicant's arguments filed 10/30/08 have been fully considered but are moot in

view of the new ground(s) of rejection. Please find below new grounds of rejection

under 35 U.S.C. 102(b) and under 35 U.S.C. 103(a). Accordingly this action is made

Non-Final.

Claim Rejections - 35 USC § 102

4.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5.   Claims 1-2 are rejected under 35 U.S.C. 102 (b) as being anticipated by Sohn et

al., "Damage diagnosis using time series analysis of vibration signals", Institute of

Physics Publishing, 2001, Pages 446-451 (hereinafter Sohn).

    a.   Regarding claim 1, Sohn discloses a method of simulating service loads

    comprising the steps of:

a) developing a service load history database including multiple time

series models representative of different service load conditions (see section

labeled "Introduction" Page 446 C1 L7-10, see for example observing a system

over time using periodically sampled dynamic response measurements from an

array of sensors, this sampling is done to obtain a service load history; also see

section labeled "Analysis Procedure" Page 448 C1 L29-34, see for example

performing the measurements in as many varying environmental and operational

conditions as possible and collecting multiple time series from undamaged

structures or known structural condition at different input force levels or various

operational conditions. The collection of these time series is called the reference

database);

b) combining the multiple time series models (see Page 448 C1 L29-34,

see for example storing the multiple time series in a database);

c) adjusting a parameter of each of the time series models(see Page 448

equation #1, see for example standardizing the time signals) and creating an

accelerated service load model (see Page 448 equation #2, see for example

creating an AR model for each time signal which represent different service load

conditions);

d) regenerating random vibration load data based upon the accelerated

service load model (see Page 448 C2 L19-23 see for example predicting results

using the AR model);

feeding the random vibration load data to a drive simulation system to

thereby cause the drive simulation system to simulate service loads in

accordance with the random vibration load data (see section labeled "Laboratory test result: an 8-DOF mass–spring system" see for example testing different cases using a mass-spring system).

Regarding claim 2, Sohn further discloses wherein said step of developing a service load history database further comprises modeling original random vibration service loads in different time series models (see section labeled "Laboratory test result: an 8-DOF mass–spring system". Page 449, see for example using a plurality of time series).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sohn et al., "Damage diagnosis using time series analysis of vibration signals", Institute of Physics Publishing, 2001, Pages 446-451 (hereinafter Sohn) in view Rao et al., "Auto-Regressive Time Series Modelling of Stochastic Surfaces", Department of Mechanical Engineering, Osmania University, MSM 2000, Pages 241-244 (hereinafter Rao).

a. **Regarding claim 3**, Sohn discloses all the limitations of the base claims
as outlined above.

But Sohn fails to clearly specify that said step of adjusting the parameter
of each of the time series models further comprises changing a value of a
variance σ^2_a; where

$$f(\omega) = \frac{\Delta \sigma^2_a}{2\pi} \cdot \frac{1}{\left| e^{mi\omega\Delta} - \phi_i e^{(m-1)i\omega\Delta} - \dots - \phi_n \right|^2}, \frac{\pi}{\Delta} \le \omega \le \frac{\pi}{\Delta}.$$

wherein f(ω) is an autospectrum of the time series model for a sampling interval
Δ as a function of angular frequency ω, and wherein ϕ_i represents said
parameter of each of the time series models for i=1. . .n.

However, Rao discloses wherein said step of adjusting the parameter of
each of the time series models further comprises changing a value of a variance
σ^2_a (see Section labeled "Time Series Modelling", see for example that the nth
order AR model has $a_t \approx$ NID $(0, \sigma^2_a)$ and σ^2_a being the variance; also see Section
labeled "Results and Discussion", see for example Table 1 and Table 2 where
the A.R. parameters ϕ_i are varied and the σ^2_a also changes); where

$$f(\omega) = \frac{\Delta \sigma^2_a}{2\pi} \cdot \frac{1}{\left| e^{mi\omega\Delta} - \phi_i e^{(m-1)i\omega\Delta} - \dots - \phi_n \right|^2}, \frac{\pi}{\Delta} \le \omega \le \frac{\pi}{\Delta}.$$

wherein f(ω) is an autospectrum of the time series model for a sampling interval
Δ as a function of angular frequency ω, and wherein ϕ_i represents said
parameter of each of the time series models for i=1. . .n (*Please note that this
autospectrum f(ω) is the frequency domain of a generic AR model. Since this*

autospectrum is not specific to a particular application it is considered as a

basic/generic representation in frequency domain of AR models and could be

obtained from the AR models taught in Rao by applying known mathematical

manipulations).

Sohn and Rao are analogous art because they are from the same field of

endeavor. They both relate to time series models.

Therefore at time the invention was made, it would have been obvious to a

person of ordinary skill in the art to modify the above teachings disclosed by

Sohn and combining them with the teachings disclosed by Rao.

One of ordinary skill in the art would have been motivated to do this

modification in order to provide an effective technique of evaluating conditions

using time series analysis and auto regressive modeling as suggested by Rao

(see for example the section labeled "Conclusions").

b.   **Regarding claim 4**, the combination of Sohn and Rao discloses all the

limitations of the base claims as outlined above. Sohn further discloses wherein

said step of regenerating the random vibration load data is based upon a

recursive formula (see Page 448 C2 L19-23 see for example predicting results

using the AR model and/or ARX model).

4.   Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sohn et

al., "Damage diagnosis using time series analysis of vibration signals", Institute of

Physics Publishing, 2001, Pages 446-451 (hereinafter Sohn) in view Rao et al., "Auto-

Regressive Time Series Modelling of Stochastic Surfaces", Department of Mechanical

Engineering, Osmania University, MSM 2000, Pages 241-244 (hereinafter Rao) and in

view of Carver et al. U.S. Patent No. 4,030,208 (hereinafter Carver).

a.   **Regarding claim 5**, the combination of Sohn and Rao discloses all the

limitations of the base claims as outlined above.

But the combination of Sohn and Rao fails to clearly specify wherein said

step of feeding the load data to a drive simulation system further comprises

converting a digital signal to an analog signal and transmitting said analog signal

to actuators.

However, Carver discloses feeding load data to a drive simulation system

and further converting a digital signal to an analog signal and transmitting said

analog signal to actuators (Abstract, C4 L1-9 and Figure 1, elements 23 and 25).

Sohn, Rao and Carver are analogous art because they are from the same

field of endeavor. They all relate to modeling/simulating random variables.

Therefore at time the invention was made, it would have been obvious to a

person of ordinary skill in the art to modify the above teachings disclosed by the

combination of Sohn and Rao and combining them with the teachings disclosed

by Carver.

One of ordinary skill in the art would have been motivated to do this

modification in order to provide a simple, economical, straight-forward and more

realistic simulation as suggested by Carver (see for example, C2 L45-67).

Conclusion

5.   Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Carlos Ortiz-Rodriguez whose telephone number is 571-
272-3766.

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's
supervisor, Paul Rodriguez can be reached on 571-272-3753. The fax phone number
for the organization where this application or proceeding is assigned is 571-273-8300.

        Information regarding the status of an application may be obtained from the
Patent Application Information Retrieval (PAIR) system. Status information for
published applications may be obtained from either Private PAIR or Public PAIR.
Status information for unpublished applications is available through Private PAIR only.
For more information about the PAIR system, see http://pair-direct.uspto.gov. Should
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Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a
USPTO Customer Service Representative or access to the automated information
system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

                                                Carlos Ortiz-Rodriguez
                                                Patent Examiner
                                                Art Unit 2123

January 6, 2009

                        /Paul L Rodriguez/
                        Supervisory Patent Examiner, Art Unit 2123